

IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE



Patent Application

Inventor(s): S. Davies

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Case: 2-6

Serial No.: 09/501,168

Group Art Unit: 2617

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Examiner: W. D. Cumming

Title: Facilitated Security For Handoff In Wireless Communications

COMMISSIONER FOR PATENTS

P.O. BOX 1450

ALEXANDRIA, VA 22313-1450

SIR:

Appellant's Brief Under 37 C.F.R. 41.37

This is an appeal to the Board of Patent Appeals and Interferences from the Final Rejection dated August 9, 2007.

A Notice of Appeal was timely filed.

Real Party in Interest

The real party in interest is Lucent Technologies Inc.

Related Appeals and Interferences

There are no related appeals or interferences.

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Status of Claims

Claims 1-2, 4-8, 10-17, and 19-22 are pending in the application.

Claims 3, 9, and 18 are canceled.

Claims 1-2, 4-8, 17, and 19-22 are allowed

Claims 16 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form.

Claims 10, 11, 14, and 15 are finally rejected under 35 U.S.C. 102(e) as being unpatentable over United States Patent No. 6,587,680 issued to Ala-Laurila et al. on July 1, 2003.

Claim 12 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 6,434,134 issued to La Porta et al. on August 12, 2002.

Claim 13 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 5,598,459 issued to Haartsen on January 28, 1997.

The rejection of claims 10-15, and objection to claim 16, is hereby appealed. A copy of the claims under appeal as now presented are appended to this brief in Appendix A.

Status of Amendments

All amendments have been entered. Only arguments were filed after final rejection.

Summary of the Claimed Subject Matter

Prior art wireless systems only permit authorized wireless terminals to have access to the wireless network. In order to permit a wireless terminal access to the network the wireless terminal must be authenticated. The term "authentication" is used herein in the conventional manner, e.g., the process of verifying that an entity is really that who it alleges it is. Authentication may be needed multiple times during the duration of a call, e.g., originally when the call is initiated and thereafter each time the wireless terminal makes a transition across any defined boundary in the network.

Authentication is achieved by comparing information derived from secret information stored in the wireless terminal with the same derived information existing somewhere else in the network. Typically the derived information must be transmitted each time a new authentication is required for a particular wireless terminal during the course of a single call from the storage location of the derived information that is "closest" to the location of the comparison, where "closest" is in terms of network hierarchy.

A wireless terminal communicates with a base station via an airlink. If the base station is not the location of the comparison, the base station must forward information from the wireless terminal to the location of the comparison for use in the comparison. The location in the network in which the derived information is stored is typically in a so called "visitor location register" (VLR). The derived information is generated in the network at a so called "home location register" (HLR) or other authentication center as may be present, depending on the particular network design. When a wireless terminal crosses a network boundary that separates the area served by a first VLR to the area served by a second VLR, the first VLR may forward the derived information to the second VLR for its use. Alternatively the second VLR may obtain its own derived information from the HLR. Note that the HLR may act as a VLR when the wireless terminal first powers up in an area directly served by the HLR.

Disadvantageously, the cost of the prior art network is high, because of the various specialized entities therein and the complex control procedures required.

We have realized that network architecture may be simplified, and the costs relating to network installation reduced, by pushing the defined boundaries in the network down to the base station level. However, a result of doing so is that authentication is required each time a wireless terminal switches communication from one base station to another. In other words, after pushing the defined boundaries down to the base station level, each time there is a handoff of the wireless terminal from one base station to another a network boundary is crossed and authentication is required. To achieve such authentication in an efficient manner, in accordance with the principles of the invention, security information, i.e., the derived information, is transferred from one base station directly to another. Note that by directly it is meant without accessing any other source of

the derived information, although the information may be transferred via other intervening nodes of the network that form an interconnection path for the base stations. Advantageously, a simplified network, i.e., a network with reduced hierarchy from a control point of view, e.g., one that only requires HLR and base station network entities along with interconnection therefor, may be employed with a minimal decrease in performance, e.g., a minimal increase in delay, during the handoff process.

More specifically, in one embodiment of the invention, a first base station which initially receives a service request from a wireless terminal requests authentication information from a central security node, e.g., an HLR, and receives in response at least, one, but typically two or more, sets of security information. The sets of security information may be a password, a challenge-response pair, a challenge-response cipher key tuple, or the like. When it is time for a handoff from the first base station to a second base station, the first base station transmits to the second base station at least one of the sets of security information it received from the central security node. The second base station then uses the information it received from the first base station to authenticate the wireless terminal, and/or engage in encrypted communication.

Claim 10 is the only independent claim being appealed. Claim 10 relates to a method of performing handoffs in a wireless network using an expedited handoff. It is supported generally by page 2, line 10 through page 2, line 29 and more specifically as follows.

10. A method for performing handoffs in a network for providing wireless communication service having at least first and second wireless base stations and a least one wireless terminal, the method comprising the steps of:	FIG. 1 shows bases stations 103 and wireless terminal 101, and FIG. 2 shows a method Page 4, line 13 through page 7, line 10
transmitting a request, from said wireless terminal for a handoff between said first base station and said second base station;	Steps 205, 211 Page 7, line 11 through page 8, line 28
receiving a response to said request at said wireless terminal, when said second base station knows said first base station prior to receiving said request, said response indicating that said	Steps 207, 208, 209, 212, 215, 225, 227 Page 8, line 29 through page 9, line 19

that said second base station can engage in expedited handoffs with said first base station; and	
connecting said wireless terminal for user traffic to said second base station;	231 Page 9, line 19 through page 10, line 6
wherein said expedited handoff employs information about said wireless terminal transferred from said first base station to said second base station.	214, 221 Page 8, line 18 through page 9, line 36 Page 10, line 12 to page 10, line 18

Grounds of Rejection to be Reviewed on Appeal

I. Are claims 10, 11, 14, and 15 are properly rejected under 35 U.S.C. 102(e) as being unpatentable over United States Patent No. 6,587,680 issued to Ala-Laurila et al. on July 1, 2003

Claim 12 is finally rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 6,434,134 issued to La Porta et al. on August 12, 2002.

II. Is claim 12 is properly rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 6,434,134 issued to La Porta et al. on August 12, 2002.

III. Is claim 13 properly rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 5,598,459 issued to Haartsen on January 28, 1997.

Argument

Issue I – Rejection of Claims Under 35 U.S.C. 102(e)

Claims 10, 11, 14, and 15 are rejected under 35 U.S.C. 102(e) as being unpatentable over United States Patent No. 6,587,680 issued to Ala-Laurila et al. on July 1, 2003. This ground of rejection is respectfully traversed for the following reasons.

Firstly, applicants note that all of the claims that presently stand rejected in this application were deemed allowable by Examiner J. K. Contee over the very same Ala-Laurila et al. reference after having originally been rejected based on this reference. See the first two Office Actions, dated October 24, 2003 and July 1, 2004. It was only after the Examiner was changed was this ground of rejection reinstituted. Notwithstanding the fact that this happens all too often, applicants believe that a change in Examiner is not be a reason for the revival of a previously overcome rejection. Unless there is a showing of incompetence on the part of the original Examiner, full credit should be given to the Examination performed by the earlier Examiner.

Next, applicants note that Ala-Laurila et al. fails to teach the limitation recited in applicants' independent claim 1 of "receiving a response to said request at said wireless terminal, when said second base station knows said first base station prior to receiving said

said request, said response indicating that said second base station can engage in expedited handoffs with said first base station”. Such a message does **not** exist in the system of Ala-Laurila et al., and indeed need **not** exist therein, because every AP in the network of Ala-Laurila et al. always “knows” every other AP in the network to which it can make a handoff, and so each AP can always exchange security information with the other AP involved in a handoff. Thus, there can never be a situation in the network of Ala-Laurila et al. in which the second base station is unable engage in an expedited handoff with the first base station. (See Ala-Laurila et al., column 5, line 43-59 and column 11, line 24 through column 12, line 16.) Consequently, there is **no** need for the message recited in applicants’ claim 10.

Note that if such a message did exist in Ala-Laurila, which it does **not**, there would never be a handoff during which it would not be sent, i.e., it would be sent for every handoff. As a result, such a message would consume bandwidth but provide no information that was not already known. Seemingly because of this Ala-Laurila et al. does **not** include such a message. For the same reason, one of ordinary skill in the art would **not** modify Ala-Laurila et al. to include such a message.

By contrast, applicants’ invention requires such a message because there are situations when a handoff will be possible, but not an expedited handoff.

Note that the section cited in the Office Action as purporting to show this element, i.e., column 10, lines 44-49, appears to relate to inter-base-station communication, and **not** to any message received at the wireless terminal. However, the claim requires the response to be received at the wireless terminal.

In response for the foregoing, the Final Office Action provided some alleged general explanations as to what is required for a valid 102 rejection of a claim. Applicants did not agree with the Final Office Action’s contentions, and in response thereto, applicants noted that what is actually required for a valid 102 rejection of a claim is for the prior art reference to teach, explicitly or inherently, all of the limitations of that claim. This means that each of the various limitations that are set forth in the claim—, which are typically defined not only by 1) a recitation of the element that makes up the limitation but **also**, at least in part, **by** 2) the inter-relationships between the elements—, must be found

must be found in the cited reference. In other words, the elements must be found in the reference, and they must have the same relationship to each other as is prescribed in the claim. Furthermore, the elements and their relationships must be set forth in the reference in a manner that gives one of ordinary skill in the art, and hence the public, possession of the invention.

Note in this regard that disparate, disconnected elements that are similar to limitations recited in a claim are insufficient, as are elements that appear to have the same relationships, at least in part, as the elements in recited in the claims but are actually different from the elements recited in the claim. While it is true that a reference that expressly discloses a claimed invention and then states that such a thing is a bad idea is an anticipatory reference—because it actually showed the entirety of the claim—, a reference that an Examiner states teaches a claim by virtue of the skill of an artisan or other reasoning from what is expressly set forth in the reference indeed does not anticipate the claim when there are actual or implied teachings in the reference that contradict the suggested reasoning of the Examiner. This is because the teaching of the reference is such that it does not put the invention in the hands of the public, in that the element is not actually or inherent in the reference but rather excluded therefrom. Furthermore, in such a situation, the Examiner's reasoning appears to likely be based not on the reference but on hindsight from the applicant's own disclosure.

Keeping this in mind, and turning to the specifics of the instant application, notwithstanding the entirety of the Final Office Action's rebuttal of applicants' arguments presented hereinabove, with which applicants clearly do not agree, applicants continue to believe that the Office Action has not made a prima facie showing that all of the elements of applicants' independent claim 10 are disclosed by Ala-Laurila et al. and thus buttress the foregoing arguments with the following additional details

First, the Office Action dated December 13, 2000, in the last paragraph of page 2, states that applicants' limitation, which recites "receiving a response to said request at said wireless terminal, when said second base station knows said first base station prior to receiving said request, said response indicating that said second base station can engage in

in expedited handoffs with said first base station” is met by column 10, lines 44-49 of Ala-Laurila et al. Applicants note that this section states:

When message 502 is received at old-AP 14, function 503 accepts the message, function 504 operates to retrieve security association parameters SA,SA from its security association (SA) data base, and function 505 operates to send a handover request that contains the parameters SA,SA to new-AP 114.

Clearly, this section does not refer to any function at the mobile terminal, as required by applicants’ claim. Rather, this section refers to functions performed at old-AP 14, which is a base station, **not** a mobile terminal. Furthermore, old-AP 14 does **not** send anything back to the mobile terminal. Rather, old-AP 14 receives a message and in response simply communicates with new-AP 114. It does **not** appear to applicants that there is any teaching or suggestion in Ala-Laurila et al. that a response as required by applicants’ claim 10 is received at the mobile terminal.

Second, it is clear that in Ala-Laurila et al., at the time of handover, **no** information about to which base station an expedited handover can be made is transmitted to a mobile terminal.

More specifically, Ala-Laurila et al. states:

Handover availability determiner 36 provides indications to mobile terminal 12 of the available APs to which a handover of communications is possible, this availability being contained in an available access point list 38 that contains the identities of the APs that are available for the handover of communications.

Available access point list 38 can be communicated to the mobile terminals 12 at selected time intervals, or access point list 38 can be provided to each mobile terminal 12 when the mobile terminal is initially activated, ...

(See Ala-Laurila et al., generally at column 7, lines 56-67, and in particular, lines 62-65 (emphasis added).) Clearly then, in Ala-Laurila et al., there is **no** suggestion to provide to the mobile terminal specifically at the time of handoff an indication as to with which base stations (the APs of Ala-Laurila et al.) the current base station can engage in expedited

handovers. Rather, at best, such an indication, which is available access point list 38, is provided to the mobile terminal at a some point in time that is independent of any handover request, i.e., at the preselected time interval or upon mobile terminal activation.

Indeed, not only is providing such an indication, i.e., list 38, at the time of handover in response to a request for a handover **not** specifically taught in Ala-Laurila et al., doing so is impliedly **taught away** from by Ala-Laurila et al. This is because to provide such a list at the time a handover is requested would increase the time required to complete the handover. However, the stated goal of Ala-Laurila et al. is to minimize the time to complete the handover, particularly for VOIP and video distribution. (See Ala-Laurila et al., column 5, lines 19-25 and column 8, lines 1-16.) Thus, one would not implement such a message given the teaching of Ala-Laurila et al., because doing so would achieve the exact opposite of the goal of Ala-Laurila et al. to minimize the time taken to achieve a handover.

Further to this point, it should be recognize that handovers are requested when the signal levels between a wireless terminal and a base station becomes weak. Weak signals tend to be prone to errors, and may necessitate retransmissions in an attempt to achieve error free transmission. Thus, if available access point list 38 is transmitted after a handoff is requested, it may need to be transmitted several times in order to be successfully received at the mobile terminal. Such retransmissions would further add to the delay in completing a handover, thus moving even further from the goal of Ala-Laurila et al. to minimize the time taken to achieve a handover.

Additional support for the proposition that in Ala-Laurila et al., at the time of handover the mobile terminal receives **no** indication, express or implied, as to the fact that any base station can engage in an expedited handover with any other base station is as follows. In the system of Ala-Laurila et al. there appears to be only one type of handover, so there is never any need to indicate what type of handover can be engaged in. Also, although in Ala-Laurila et al. the request for handover may be initiated by the mobile terminal, the handover process thereafter is driven by the base stations, which have **no** need to tell the mobile terminal what type of handover can be had, as they coordinate merely amongst themselves.

Moreover, at the time of the handover request the mobile station **already knows** with whom the base station can engage in a handover, by virtue of available access point list 38, which was made available to it prior to the handover request and **not** in response to any handover request; and since the mobile station knows prior to the handover request with whom the base station can engage in a handover, there is **no** need at the time of handover to transfer, or indicate, express or impliedly, the same information. Indeed, not only would doing so be redundant, but any express indication would be time consuming and a waste of resources, because of the express knowledge already available at the mobile terminal, i.e., list 38, and there is certainly **no** need for an implied indication to the mobile terminal when there already is express knowledge available at the mobile terminal of whatever is allegedly implied. Furthermore, given the fact that in Ala-Laurila et al. there is only one type of handoff, the request for a handoff by the mobile terminal is inherently a request for an express Ala-Laurila et al.-type handover, so there is **no** need to indicate in a response that such a handover is possible, since being the only type of handover available, of course it is possible.

However, as noted above, by contrast, applicants' independent claim 10 requires that an indication that the second base station can engage in expedited handoffs with the first base station be received by the wireless terminal in the response to the request for handoff. This is because claim 10 requires that the response to the handoff request received by the wireless terminal must indicate that the second base station can engage in expedited handoffs with the first base station when that is indeed possible. Thus, the response itself must include, or imply, an indication that the second base station can engage in expedited handoffs with the first base station. However, as explained hereinabove, in Ala-Laurila et al. there is **no** such indication, express or implied, in any response to the mobile terminal at the time of handover, if there even is a response.

Thus, Ala-Laurila et al. does **not** meet, expressly or impliedly, the terms of applicants' claim language, even broadly construing applicants' claim language. Beyond that, of course, when read in view of the specification, applicants' claim language defines an invention different than what Ala-Laurila et al. teaches.

Since Ala-Laurila et al. does not teach all the elements of applicants' claim 10, applicants' claim 10 is allowable over Ala-Laurila et al. under 35 U.S.C. 102. So too claims 11, 14, and 15, which depend from claim 10 and include all the limitations thereof, are allowable over claim 10.

Issue II – Rejection of Claim 12 Under 35 U.S.C. 103(a)

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 6,434,134 issued to La Porta et al. on August 12, 2002.

This ground of rejection is respectfully traversed for the following reason.

Given that independent claim 10 from which dependent claim 12 depends is allowable over Ala-Laurila et al. for the reasons cited hereinabove, and La Porta et al. is not cited for the proposition that it supplies, and indeed it does not supply, at least the element indicated hereinabove to be lacking in Ala-Laurila et al., dependent claim 12 is allowable over the proposed combination under 35 U.S.C. 103(a).

Issue III – Rejection of Claim 13 Under 35 U.S.C. 103(a)

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ala-Laurila et al. in view of United States Patent No. 5,598,459 issued to Haartsen on January 28, 1997.

This ground of rejection is respectfully traversed for the following reason.

Given that independent claim 10 from which dependent claim 13 depends is allowable over Ala-Laurila et al. for the reasons cited hereinabove, and Haartsen is not cited for the proposition that it supplies, and indeed it does not supply, at least the element indicated hereinabove to be lacking in Ala-Laurila et al., dependent claim 13 is allowable over the proposed combination under 35 U.S.C. 103(a).


Conclusion

In view of the foregoing, it is submitted that the Examiner is in error. It is, accordingly, respectfully requested that the rejection of claims 10-15, and the objection to claim 16 be reversed and the application passed to issue.

Respectfully,

S. Davies

M. Vanderveen

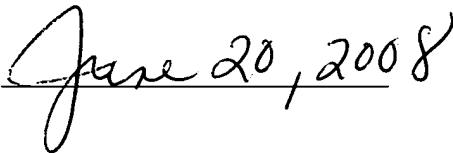
By 

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908-582-4323

Lucent Technologies Inc.

Date: 

Claims Appendix

1 1. A method for facilitating secure handoff in a network having at least first and
2 second wireless base stations and at least one wireless mobile terminal, the method
3 comprising the steps of:

4 receiving a request from said at least one wireless mobile terminal for a handoff
5 from said first base station to said second base station; and

6 transferring security information that was originally supplied by a central security
7 node and was not used by said first base station from said first base station to said second
8 base station in response to said request;

9 wherein at least a portion of said security information is used to validate said at
10 least one mobile wireless terminal to said second base station.

1 2. The invention as defined in claim 1 further wherein said security information
2 includes a set including at least a random number, an authenticator derivable by said
3 wireless mobile terminal but not said first or second base stations, and a key.

1 3. (canceled)

1 4. The invention as defined in claim 1 further wherein said security information
2 transferred from said first base station to said second base station in response to said
3 request is less than all of the security information received by said first base station.

1 5. The invention as defined in claim 4 wherein all of the security information
2 received by said first base station was received from a wireless mobile terminal validation
3 system.

1 6. The invention as defined in claim 4 wherein all of the security information
2 received by said first base station was received from a third base station.

1 7. The invention as defined in claim 1 wherein said transferring security
2 information from said first base station to said second base station in response to said
3 request is performed only when said first base station knows said second base station prior
4 to said receiving step.

1 8. The invention as defined in claim 1 further comprising the step of initiating an
2 encrypted link between said second base station and said wireless terminal when said first
3 base station and said wireless terminal were communicating using an encrypted link, said
4 second base station using said security information transferred from said first base station
5 to said second base station in initiating said encrypted link between said second base
6 station and said wireless terminal.

9. (canceled)

1 10. A method for performing handoffs in a network for providing wireless
2 communication service having at least first and second wireless base stations and a least
3 one wireless terminal, the method comprising the steps of:

4 transmitting a request, from said wireless terminal for a handoff between said first
5 base station and said second base station;

6 receiving a response to said request at said wireless terminal, when said second
7 base station knows said first base station prior to receiving said request, said response
8 indicating that said second base station can engage in expedited handoffs with said first
9 base station; and

10 connecting said wireless terminal for user traffic to said second base station;

11 wherein said expedited handoff employs information about said wireless terminal
12 transferred from said first base station to said second base station.

1 11. The invention as defined in claim 10 wherein said information is security
2 information.

1 12. The invention as defined in claim 10 wherein said information is security
2 information received from a security center.

1 13. The invention as defined in claim 10 wherein said information is security
2 information received from a base station other than said first or second base stations.

1 14. The invention as defined in claim 10 wherein said information is security
2 information and includes at least one from the set consisting of: (i) a password, (ii) a
3 challenge-response pair, and (iii) a challenge-response cipher key tuple.

1 15. The invention as defined in claim 10 wherein said information is security
2 information that is received over a network for inter base station communication.

1 16. The invention as defined in claim 10 wherein said connecting step further
2 includes the step of

3 initiating an encrypted link between said second base station and said wireless
4 terminal when said first base station and said wireless terminal were communicating using
5 an encrypted link prior to said handoff request, said second base station using security
6 information transferred from said first base station to said second base station as part of
7 said response in initiating said encrypted link between said second base station and said
8 wireless terminal.

1 17. A method for performing handoffs in a network having at least first and second
2 wireless base stations and a least one wireless terminal, the method comprising the steps
3 of:

4 transmitting a request, from said wireless terminal for a handoff between said first
5 base station to said second base station;

6 when said second base station does not know said first base station prior to
7 receiving said request, receiving at said wireless terminal an indication that it must connect
8 to said second base station without benefit of security information supplied from said first
9 base station.

18. (canceled)

1 19. The invention as defined in claim 17 wherein said security information is
2 received from a security center.

1 20. The invention as defined in claim 17 wherein said security information is
2 received from a base station other than said first or second base stations.

1 21. A method for performing a handoff in a wireless network having at least first
2 and second base stations and a least one wireless terminal, the method comprising the steps
3 of:

4 receiving a request, by said second base station, from said wireless terminal for a
5 handoff between said first base station to said second base station;

6 performing an expedited handoff using previously unused security information
7 when second base station knows said first base station prior to receiving said request; and

8 performing a nonexpedited handoff when second base station does not know said
9 first base station prior to receiving said request.

1 22. The invention as defined in claim 21 wherein said step of performing an
2 expedited handoff includes the step of transferring security information from said first base
3 station to said second base station.

Evidence Appendix

None

Related Proceedings Appendix

None